APPENDIX T LIGHTING IMPACT ANALYSIS

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Victoria Park / Barrambin

Lighting Impact Analysis

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About Rubidium Light

Rubidium Light is a specialist lighting design consultancy that works with stakeholders across many areas of development from concept to final construction.

Rubidium Light has been running since 2011 and brings together an in-depth knowledge of lighting and its application in technically difficult lighting solutions.

Rubidium Light prides itself on its ability to react quickly and in a cost-effective manner to supply outcomes both responsible and cost effective to its clients and the environment.

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1. Executive Summary

Rubidium Light has been engaged by *Brisbane City Council* to prepare this Lighting Impact Analysis to support a Local Government Infrastructure Designation (LGID) that is made over part of the Victoria Park / Barrambin Master Plan site.

The LGID is made over part of the site to give statutory effect and facilitate the delivery of elements of the Victoria Park / Barrambin Master Plan (Master Plan) which is intended to transform the 64 - hectare parkland into a multi-function metropolitan park, with various spaces for passive and active recreation, along with opportunities to host an expanded range of diverse events and activations. The Master Plan sets out the roadmap for the park's redevelopment following community and stakeholder consultation and various technical studies, whereas the LGID will be the planning approval which allows elements of the master plan to be delivered on site.

This report is provided to understand the possible adverse effects of outdoor lighting within the proposed site, understand how we address these effects and to form a framework around the park's future lighting and its sympathetic integration with the park's enhanced role in line with the master plan.

Rubidium Light has undertaken an existing site lighting survey (baseline) to establish the current lighting conditions of the site. We have further established lighting requirements for the proposed site design including:

- Brisbane City Council City Plan 2014
- AS/NZS1158.3.1:2020 Lighting for roads and public spaces, Part 3.1: Pedestrian area (Category P) lighting – Performance and design requirements
- AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting
- AS/NZS2560.2:2021 Sports lighting Part 2: Specific applications

A high-level concept lighting design has been developed around the above stated requirements.

We have struck a balance between the lighting needs of park users while developing lighting systems that reduce impact to fauna within the proposed site. This proposed system has been developed considering what we know about human and fauna behaviour to light and will result in a positive outcome for park users through the enhancement of night time safety with minimal impact on resident fauna.

Through the introduction of our proposed Lighting Plan, application and control of light sources, the intended results will be achieved, providing Brisbane City with a central park enjoyed for its safety and fauna experiences on the city fringe.

2. Introduction

2.1. Property Summary

Victoria Park / Barrambin site is located 3km north of the Brisbane Central Business District.

The Victoria / Barrambin Master Plan comprises a number of land parcels. The primary land parcels forming part of the LGID include:

- 290 Gilchrist Avenue, Herston QLD 4006
- 271 Gilchrist Avenue, Herston QLD 4006
- 223 Herston Road, Herston QLD 4006
- 454 Gregory Terrace, Spring Hill 4000
- 74 Gregory Terrace, Spring Hill 4000
- 278 Gregory Terrace, Spring Hill 4000
- 400 Gregory Terrace, Spring Hill 4000
- 77A Victoria Park Road, Herston QLD 4000

The site is situated towards the top of a natural south to north rise but also contained within a depression as part of the natural rising topography.

The adjacent properties are a mix of roadways, commercial and residential properties.

A Council-managed golf course operated on the site until 30th June 2021. The subject site is reinstating parkland purposes and transitioning it from former golf uses while still retaining some golfing features e.g., putt-putt and driving range. Other operational facilities at the site include event spaces including the function centre and bistro, community sports precinct including a sports field, multi-purpose court, cricket nets and tennis courts, as well as Centenary Pool. The site is also punctuated by the existing Inner Northern Busway and Inner-City Bypass Roadway.

Fig:1 Surrounding Development Types

2.2. Purpose of Report

This report details the existing and proposed lighting schemes for the Victoria Park / Barrambin site including proposed mitigation measures to ensure a lighting outcome in keeping with the proposed purpose of the site. Analysis has been undertaken to AS/NZS1158.3.1:2020 Lighting for roads and public spaces, Part 3.1: Pedestrian area (Category P) lighting – Performance and design requirements and AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting.

2.3. Development Overview

Rubidium Light has been engaged by *Brisbane City Council* to prepare this Lighting Impact Analysis to support a Local Government Infrastructure Designation (LGID) that is made over part of the Victoria Park / Barrambin Master Plan site.

The LGID is made over part of the site to give statutory effect and facilitate the delivery of elements of the Victoria Park / Barrambin Master Plan (Master Plan) which is intended to transform the 64 - hectare parkland into a multi-function metropolitan park, with various spaces for passive and active recreation, along with opportunities to host an expanded range of diverse events and activations. The Master Plan sets out the roadmap for the park's redevelopment following community and stakeholder consultation and various technical studies, whereas the LGID will be the planning approval which allows elements of the master plan to be delivered on site.

The Plan of Designation illustrates the part of the site which is included in the Master Plan over which the LGID request applies (a shown in Figure 2 below). For clarity, the part of the Master Plan area where statutory effect is sought through the LGID process will be referred interchangeably herein as the 'the site, premises and the Designation Area'.

Fig:2 Plan of Designation

The Illustrative Master Plan contained at Figure 3 includes areas that extend beyond the proposed Designation Area, and existing elements within the Designation Area which are not intended to be subject to change as a consequence of the LGID. These areas do not form part of this LGID request.

Specific exclusions from the LGID include:

- The south-western part of the Master Plan area, which includes land at 15, 36, 40, 40A, 40B, 40C, 40D, 40E, 40F, 50 70, 70A & 77 Gilchrist Avenue, Herston, 1A Ithaca Street, Kelvin Grove and 51A College Road, Spring Hill.
- Three small allotments at the southern side of the rail line, located at 140, 410 and 412 Gregory Terrace, Spring Hill.
- The western bridge connection from the south-western part of the Master Plan area to Brisbane Girls Grammar School.
- Old Club House at 309 Herston Road, Herston.

The existing uses and buildings associated with the Victoria Park Bistro, driving range (other than some changes to levels resulting from proposed earthworks), putt-putt, Function Centre and Centenary Pool located within the Designation Area are proposed to be retained.

The proposal seeks to designate the premises for various infrastructure purposes, in accordance with Schedule 5 of the Planning Regulation 2017 ('the Planning Regulation'). Specifically, the LGID seeks endorsement for the following infrastructure categories:

Infrastructure for transport

2 – transport infrastructure

Other infrastructure

3 – community and cultural facilities:

11 – facilities for parks and recreation;

17 – sporting facilities; and

20 – storage and works depots and similar facilities, including administrative facilities relating to the provision or maintenance of infrastructure stated in this part.

Fig:3 Illustrative Master Plan

A rewilding of the remaining site footprint is of major focus including waterways and outdoor recreation areas. This brings together an inner-city wild park concept and supplies an incentive for the return of fauna to the site.

The proposed lighting systems and baseline study have been focused on lighting outcomes for both human and fauna sensitive receptors. Advice from the ecologist, 28 South, is that existing and potentially future species of fauna inhabiting the parkland have adapted to the current levels of urban environmental ambient light.

3. Overview of Current Lighting Arrangement

Rubidium Light personnel undertook a site investigation and conducted a dilapidation survey of existing lighting conditions to form the basis for our baseline study.

Location, type, aiming details and mounting heights were identified and recorded for each external luminaire. This data was used to create a lighting baseline analysis to quantify existing obtrusive light conditions.

Much of the existing lighting infrastructure would not be appropriate to be specified for the proposed use of the parklands and the revised obtrusive light standards, notably, the limits on upward waste light and obtrusive light in the direction of surrounding residences.

Colour temperatures of light sources were mixed and estimated to range from 6000-3000K.

Refer of Baseline Study Report drawing **URB00352-E01 Obtrusive Light Existing Conditions**

Fig:4 Examples of existing lighting systems

4. Overview of Proposed Lighting Arrangement (including feature lighting)

Good lighting is acknowledged for its ability to stimulate a location or city, bring people together to enjoy our lifestyle, aid small businesses, and boost the neighbourhood economy. The results of lighting may enhance events, give Brisbane a distinctive identity, and add aspects of surprise and discovery to the city experience for both inhabitants and visitors.

It's important to recognise that not all spaces within the park need to be lit. Large sections of unlit spaces, punctuated by the pathways help to reinforce the sense of re-wilding and supply visual interest for park users. Secondary pathways through rewilded areas can also have lighting time-limited to provide a balance between park user safety and mitigating potential fauna impacts.

Utility areas such as carparks and primary paths will be illuminated to meet Australian Standards and BCC requirements. The Australian Standards, *Lighting for roads and public spaces, Pedestrian area AS/NZS1158.3.1-2020* and *Sports Lighting AS/NZS2560.2-2021* set minimum requirements for lighting to specific tasks.
By providing a hierarchy of lighting, users can be encouraged to gravitate towards points of interest, and to avoid areas where fauna are provided with refuge at night.

The proposed lighting for the project provides safe movement for park users. Lighting promotes a feeling a safety and gives park users the ability to see their surrounds and identify potential approaching hazards in time for action. This type of lighting must be active whenever the park is in use after sunset unless access control measures are put in place.

Other areas of the park, such as sporting areas, only need to be active when the facilities are in use. Generally, where access is uncontrolled this is provided in the form of a photoelectric cell (PE Cell) activation and timeclock deactivate at a pre-determined curfew time. Other controlled access areas, such as the football field, can be fitted with a lighting control system that allows authorised users to activate and deactivate the lights. A time clock control mechanism will provide a deactivation override at curfew.

5. Potential Effects of Lighting

It should also be recognised that lighting can activate a space or city, bring people together to celebrate our enviable lifestyle, support small businesses and create a strong local economy. Lighting and projection outcomes can support events, create a unique identity for Brisbane and introduce elements of surprise and discovery enhancing the city experience for residents and visitors. This is recognised by Council developing a City of Lights Strategy. That said, there are some potential impacts which should be considered in recommending the park's future lighting approach.

5.1. Direct Light

Fig:5 Direct light sources at night

The impact of direct uncontrolled light can be clearly seen at night in almost all locations around the world. Any uncontrolled light source can be seen from distances up to the horizon and generally detract from the natural beauty of an environment.

Light emitted by luminaires can be controlled to greatly reduce or stop the view of direct light from a site into neighbouring properties by way of careful luminaire selection and installation.

The Australia Standard for Control of Obtrusive Light AS/NZS4282 sets limits for the direct intensity of light sources in the direction of sensitive receptors e.g., residences.

Uncontrolled light also has a negative impact on the surrounding environment and night sky. It has been shown that obtrusive light may have an impact on many fauna and flora species.

5.2. Sky Glow

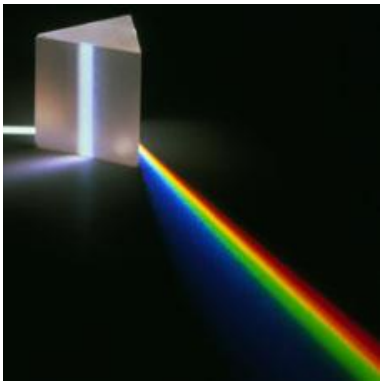

Fig:6 Components of White Light

Sky Glow is a term used to describe light reflected from surfaces into the night sky. Sky Glow can also be caused by uncontrolled light sources emitting light above the vertical plane subtended by the light source itself.

This effect can be less obvious when environmental conditions are clear, as light requires particles to reflect off of before it can be seen. A low concentration of aerosols in the night sky can reduce the apparent extent of glow.

Light emitted from light sources into the sky or reflected off objects into the sky is only part of the story.

Scotopic (low light) vision is more sensitive in the blue wavelength range, which increases perceived sky glow at night.

Glow can be made worse by poor choice of light source type. Due to the makeup of our atmosphere, (being mostly made of nitrogen, oxygen, argon, and water vapour), it acts to absorb, scatter, or transmit light dependant on its wavelength or colour. We know white light is a composition of coloured light. A good example is a prism where white light enters one end and through different refraction of wavelengths acts to split that white light into its components. Our atmosphere acts in much the same way, splitting the white light from the sun and allowing some to pass through while others are absorbed, and others scattered.

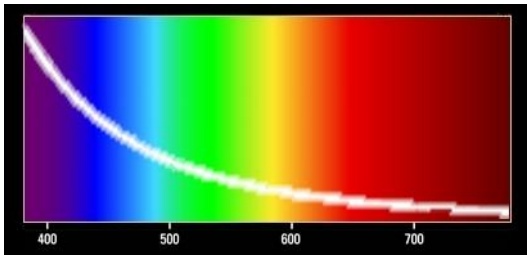

Fig:7 Scatter of light compared to Wavelength

This scatter effect is of most interest to us. Our atmosphere scatters light from the blue end of the spectrum (short wavelengths) more readily, the reason why the sky is blue. We can take advantage of this scattering of blue rich light sources by avoiding this type of source ensuring low blue light output to further reduce scatter or glow. Research has shown a 25% increase in light scatter when comparing blue rich LED sources and traditional High Pressure Sodium light sources. Light source choice will be covered in more details further on in this document.

6. MITIGATION STRATEGIES

6.1. Lighting Control Systems

The surrounding development is predominantly commercial and/or public use namely, with some residences located on Victoria Park Road and Herston Road in the immediate vicinity of the development.

Multiple measures can be employed for the amelioration of potentially adverse effects of lighting systems.

One method is activation times. Control of the time of night when the lighting is switched off greatly reduces perceived impact to sensitive receptors, including neighbouring residences and fauna.

Another method of lighting control is to switch off, or dim luminaires based on human occupancy. By using LED luminaires fitted with optional movement sensors, light output can be reduced or completely switched off if no park users are present in the immediate area. An added benefit of this method is a reduction in energy consumption.

6.2. Areas to be lit

The decision of what areas to light within the project should be considered carefully. This decision should be balanced with the needs to the park users including safety and compliance with relevant standards and the need to reduce cumulative impact of light sources on sky glow.

Areas which are to be actively used after sunset by the public should be provided with sufficient light to allow for their safe use.

Areas which are active also change during night-time hours and effective dimming or switching of lighting system in these areas can further act to reduce impact.

Providing additional light in areas not in use has been avoided to enhance the rewilding site goal for this project.

6.3. Light Density

During the design process no outdoor areas are to be over-lit, ensuring conservative installation cost, power consumption and obtrusive light outcomes.

Further to the requirements set by these standards, there are relevant sub-categories for each area dependent upon the frequency of use, fear of crime or standard of play when it relates to sports. Careful investigation of these requirements and appropriate application to the site can reduce installation costs, energy costs, maintenance cost and obtrusive light effects.

A comprehensive analysis of the site and its uses has been prepared and aligned with the minimum requirements of relevant sub-categories of the relevant Australian Standards. This balances the needs for the park users while promoting the natural beauty of the site and achieves other benefits are detailed previously.

Refer of Lighting Sub-Category Assignment drawing **URB00352-E01**

6.4. Light Source Characteristics

Light Emitting Diode (LED) light sources are characterised by a number of metrics which allows us to quantify the appearance of the light source.

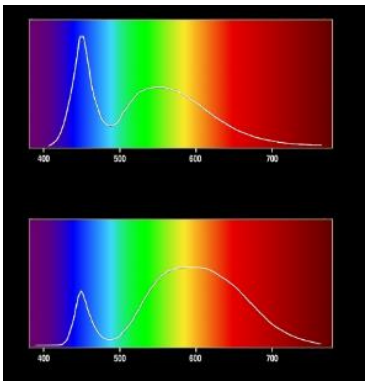

Fig8: Comparison of 4000K vs 3000K spectral output

LEDs are available in the full range of colour and colour temperatures of white light and other colours. Humans have adapted to their environment and our vision is based around white light. However, as a by-product of producing white light, LEDs also produce an amount of blue light as part of their spectral output.

Our vision is based on the perception of reflected light from an object. The light source is an important part of this process. Generally, humans perceive the world by full spectrum e.g., Sunlight or Moonlight. This means that the light source produces light in a spectrum of the human spectral response range, as well as others outside this range. This gives us the ability to see objects of all colours. With a reduction in light output anywhere on the light source's spectrum, this ability is reduced.

The human eye has cells in the retina called Photoreceptors. There are two photoreceptor types: Rods and Cones. There are three types of Cone photoreceptors, red, blue and green. These enable colour vision in bright light (photopic vision). The Rods enable pigmentation in low-light environments (mesopic and scotopic vision).

During daylight conditions, the human eye uses predominantly the "Cone" photoreceptors, which make it possible to see multiple colours. As the amount of ambient light decreases, the human eye adapts by using the "Rod" receptors which respond to light-and-dark, but not colours, and the Cone receptors become less sensitive.

The 3000K CCT light source still contains a component of blue light which is required to stimulate the Rod receptors in the eye during Mesopic and Scotopic visual conditions but provide a reduced

emission in the low frequency range of the spectrum reducing possible adverse effects discussed earlier in this document.

6.5. Colour Temperature

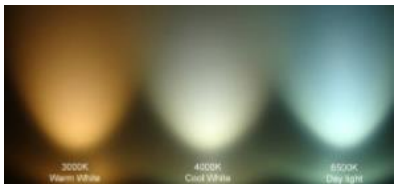

Fig9: Comparison of Colour Temperatures

Correlated Colour Temperature (CCT) is a metric which defines the colour appearance of visible light sources. Generally, for white light sources used in public areas this would extend from 2000K (amber) to 6000K (blue-ish white). CCT is an important part of many tasks we perform as a human. An example, relative to this project, would be sports. As we play sports, we are required to measure a balls speed and trajectory quickly and precisely. To aid in this, the ball is designed to contrast its background and this contrast is seen by providing light to both the ball and its background to enable its identification. This requires the provision of full spectrum light sources which can render the ball and background colours well. Therefore, some tasks within the site require the use of a cooler light source in the form of 4000K where other tasks not requiring colour definition.

AS/NZS4282:2019 – Control of the obtrusive effects of outdoor lighting - Appendix C – Impact of External Lighting on Biota (Informative), Moonlight is considered to have a colour temperature of 4050 K to 4100 K

6.6. Colour Rendering Index (CRI)

Colour Rendering Index (CRI) is the metric used to quantify the ability of a light source to faithfully replicate to true colour of an object. Light sources with a high CRI will more faithfully render an object's colour. In outdoor areas a high CRI will result in easier identification of the natural environment and enhance facial recognition. At the time of tender evaluation careful consideration should be given to CRI of the light sources chosen to ensure a favourable outcome is achieved. It is proposed that a minimum CRI of 90 be specified for all luminaires.

The human eye needs blue content to discern fine details when illumination levels are low, or when the eye is in a scotopic state. This is crucial when considering CPTED (Crime Prevention Through Environmental Design) principles and the consequences of metamerism.

Paths have been provided with a 3000K CRI 90 light source which greatly reduces blue light emission. Careful consideration should be given to spectral power distribution in the "blue" end of the spectrum to ensure a reduced level of output in that part of the light source's spectral distribution.

6.7. Lighting emission control

While some LED sources may emit higher proportions of blue light than traditional streetlighting sources, practice-based research and case studies have shown that design factors for LED luminaires can offset the increase in sky glow that may arise from their increased blue light content. In particular, the reduction of upwards-directed light, as well as light close to the horizontal, and the

opportunity for dimming afforded by LED technologies have been demonstrated through modelling and in practice, to effectively negate potential increases in sky glow compared with traditional high pressure sodium sources. A study exploring these factors suggests that reducing the upwards light output ratio (ULOR) of a source is the factor with the greatest potential to reduce sky glow for distant observers.

The selection of light sources directly relates to the type of luminaire that can be used. Public lighting is always a compromise between people's perception of safety in that space through their ability to see and an economic cost of providing that light. When we also include environmental considerations the balance changes again. We have proposed a compromise that not only creates an industry best practice environmental result but also gives the user a feeling of safety and increases the observed prestige of this project.

In the past High Intensity Discharge (HID) light sources have been used in large luminaire mounted typically at 6-10m above the surface. This was a mechanism of the light source size and for other large ancillary equipment needed to run these light sources e.g., control gear.

This infrastructure was individually expensive but allowed large spacing between luminaires resulting in an overall economic result.

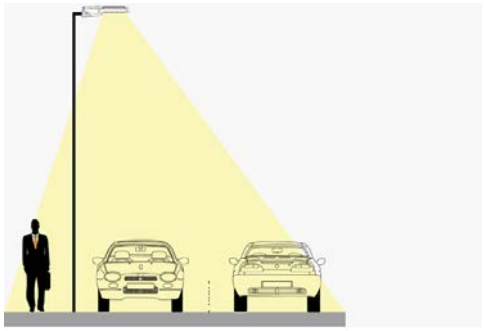

Fig10: Illustration of controlled light emission

Unfortunately, this also resulted in high levels of uncontrolled spill light and, simply due to their height, also resulted in large areas of opportunity in resultant glow and uncontrolled reflection of light.

With the advent of LEDs, it has allowed the economic minimisation of luminaires. This gives us the option to mount the luminaires much closer to the surface that they are lighting, in this case at 5.5m as required in the Brisbane City Plan 2014, enabling the selection of much less powerful light sources and much stricter control of light.

Mounting light sources closer to the ground and using an asymmetrical distribution we can effectively keep more reflected light closer to the ground and out of the night sky.

Although some level of scattered reflection from surfaces is unavoidable, we can control a vast amount of reflected light in a purposeful way.

We know that the angle of incidence of light impact upon an object will be equal to the angle of reflection and using our proposed method exploits this fact to achieve a desirable result.

This results in lower upward cast of reflected light due to the low originating location of the light source and low angle of incidence to our lit surfaces.

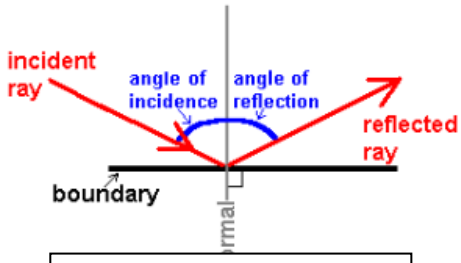

Fig11: Illustration of surface reflection

7. Assessment against Brisbane City Plan 2014 / Australia Standards

7.1. General Overview of Compliance

The proposed lighting scheme depicted on drawing **URB00352-E01** complies with BCC City Plan 2014 and with the Australian Standards for sports lighting, public area lighting and obtrusive light with a few proposed alternate solutions addressed in section 7.2.

Outdoor Lighting Code		
PO1 Development provides outdoor lighting that does not have an adverse impact on any person, activity or fauna because of light emissions, either directly or by reflection.	AO1.1 Development ensures that technical parameters, design, installation, operation and maintenance of outdoor lighting: a. comply with the requirements of AS 4282-1997 Control of the obtrusive effects of outdoor lighting. b. maintain a minimum of 20lux at the footpath level where in a zone in the centre zones category or the Mixed use zone. Note—The effects of outdoor lighting should be mitigated where a window of a habitable room of a nearby dwelling will be illuminated beyond maximum permissible values outlined in AS 4282-1997 Control of the obtrusive effects of outdoor lighting.	Complies The proposed lighting scheme complies with PO1. AO1.1(a) is satisfied through demonstrated compliance with AS/NZS4282:1997. AO1.1(b) does not apply to this development.
	AO1.2 Development provides floodlighting that is restricted to a type that gives no upward component of light where mounted horizontally, such as a full cut off luminaire.	Complies AO1.2 is satisfied through the selection of luminaires with full cut-off photometric distribution.

4.3.6 Pathway Lighting	4.3.6.1 Scope 1. Lighting is provided on: a. pathways identified on the Bicycle network overlay map. b. other pathways that: i. have high usage outside daylight hours; or ii. have potential hazards for travel in the dark, such as difficult grades or complex geometry; or iii. have conflict points such as pathway intersections and intersections with roads; or iv. are not under visual surveillance and where personal safety of travellers after dark might be compromised such as under bridges, tunnels, underpasses and long pathways.	Pathways have been lit to the hierarchy shown on Rubidium Light drawing URB00352-E01B, taking into consideration the traffic density and types of use.

4.3.6.2 Sustainability	1. Pathway lights installed shall minimise energy use and reduce life cycle costs.	This is achieved through the use of appropriately sized (Wattage) and located luminaires with LED light-source.
	2. Pathway lights shall be enabled for smart controls by being fitted with a National Electrical Manufacturers Association (NEMA) 7 pin receptacle or an alternative approved by Council.	All proposed pathway luminaires to be capable of supporting smart controls and fitted with NEMA 7-pin bases
4.3.6.3 Lighting Design	1. The lighting design is to be constructible, maintainable, sustainable, safe and affordable. It should have regard to the ability to access the installation for maintenance, cost of equipment used, and the availability and cost of spare and replacement parts.	All proposed luminaires and associated equipment to be sourced from proprietary manufacturers. No bespoke types will be installed. Mounting heights are as recommended in 4.3.6.7 (5.5m) to enable maintenance. The proposed luminaires to be covered by manufacturers' warranty for a period of not less than ten years
	2. Unless specified otherwise in this chapter, or by written requirements of Council, the design and installation of pathway lighting shall: 1. conform to AS/NZS 1158- Lighting for roads and public spaces (set) - (AS/NZS 1158). 2. meet the applicable AS/NZS 1158.3.1 lighting subcategories specified in Table 4.3.6.3.A in this chapter.	The proposed pathway lighting design complies with AS/NZS 1158- Lighting for roads and public spaces (set) - (AS/NZS 1158) and meets meet the applicable AS/NZS 1158.3.1 lighting subcategories specified in Table 4.3.6.3.A

Table 10.3.6.6.A Pathway Lighting	Along pathways that link picnic nodes, playgrounds, skate parks and other activity areas where night use occurs to car parks and major access points AS/NZS1158.3.1:2020 Cat PP3	Major (high use) Pathways are compliant with AS/NZS1158.3.1:2020 Cat PP3
	Along pathways that provide a thoroughfare between transport nodes and nearby residential areas AS/NZS1158.3.1:2020 Cat PP4	Minor (low use) Pathways are compliant with AS/NZS1158.3.1:2020 Cat PP4
	Conform with AS/NZS 4282 - Control of the obtrusive effects of outdoor lighting	All pathway lighting complies with AS/NZS4282:1997
Table 10.3.6.6.A Internal Park roads	Compliant with AS/NZS1158.3.1:2020 Cat PR5	Internal Park Roads is compliant with AS/NZS1158.3.1:2020 Cat PR5
Table 10.3.6.6.A Car parks	Compliant with AS/NZS1158.3.1:2020 PC1 – high use PC3 – low use PCD – disabled parking spaces	Carparks are compliant with AS/NZS1158.3.1:2020 Cat PC1 (high use), PC3 (low use) and PCD
Obtrusive Light	Conform with AS/NZS 4282 - Control of the obtrusive effects of outdoor lighting	All lighting complies with AS/NZS4282:1997
10.3.6.6.4 Correlated Colour Temperature and Colour Rendering Index	1. The nominal CCT of all park lighting shall be 4000 kelvins (K). 2. The minimum CRI for all park lighting should be the maximum available, but not less than 70.	Correlated-Colour-Temperature (CCT) and Colour-Rendering-Index (CRI) of the light sources were both considered from an aesthetic and visual performance standpoint. A luminaire light source CCT of 3000K and CRI of 90 was chosen to provide similar appearance to natural dusk lighting conditions and provide excellent visual conditions at low light levels.

10.3.6.6.5 Specific requirements for pathway lighting	Alternate technologies, such as solar lighting, should demonstrate that the life cycle costs are less than or equivalent to a mains power alternative prior to their use	Not applicable to this proposal
	Bollard lighting used for public safety purposes is only used where shadows from overhead lighting could cause a safety risk and the location is unlikely to be subject to a high level of vandalism.	Not applicable to this proposal
	Electrical reticulation is located, designed and constructed to minimise impacts on existing landform and vegetation	To be determined at detailed-design stage of project
	Subject to Council approval, timing or sensor devices may be appropriate in some locations where use is desired for a limited night time period, or where there is low use at night or in environmentally sensitive areas. Council will approve the on/off times and dimmed lighting levels.	To be determined at detailed-design stage of project.
	Lighting for fully enclosed pedestrian underpasses (e.g., a subway or tunnel) is to comply with AS/NZS 1158 lighting subcategory PE1. For other pedestrian underpasses lighting is to comply with lighting subcategory PE2.	Not applicable to this proposal

7.2. Alternative Solutions to Brisbane City Plan 2014

7.2.1. A suitably qualified Electrical Engineering Consultant to consult with Council and propose lighting design.

Supporting notes to table 4.3.6.3.A and 10.3.6.6.A states *"A lighting design certified by a suitably qualified Electrical Engineering Consultant must be provided to Council. Note—For further information on the Council assessment process and the requirements for a suitably qualified Electrical Engineering Consultant, refer to the Infrastructure Installation and Construction Requirements Manual."*

Lighting designs have been prepared by a suitably qualified and experienced Member of the IESANZ (MIES) and Registered Lighting Practitioner (RLP). The Illuminating Engineering Society (IESANZ) is the recognised industry body for lighting in Australia and New Zealand. Queensland legislation (Professional Engineers Act 2002) does not recognise the need for RPEQ certification of lighting discipline design, nor do they provide an indication of an engineer's experience in lighting application.

7.2.2. The nominal CCT of all park lighting shall be 4000 kelvins (K).

Correlated-Colour-Temperature (CCT) and Colour-Rendering-Index (CRI) of the light sources were both considered from an aesthetic and visual performance standpoint. A luminaire light source CCT of 3000K and CRI of 90 was chosen to provide a reduction in lower frequency emissions while providing a high level of colour rendition similar to that achieved by higher CCT light sources (4000K) as required by The Brisbane City Plan 2014.

7.2.2.1. Qualitative Aspects

The Spectral Power Distribution of the proposed luminaire indicates that the lower Correlated Colour Temperature (CCT) light sources (2700K purple line) and (3000K red line) have a significant reduction in light emitted in the blue part of the spectrum. Blue light is accepted to contribute to sky-glow through atmospheric scattering.

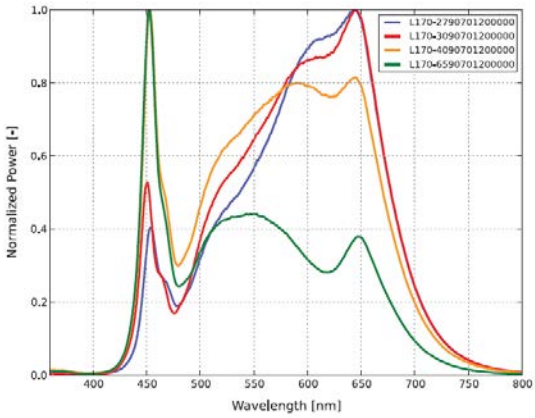

Figure 1c. Typical normalized power vs. wavelength for L170-xx90701200000 at test current, T_j=25°C.

Fig12: Spectral output of LED sources with high CRI value

8. Assessment against Relevant Australian Standards

The proposed lighting scheme complies with the following Australian Standards:

Paths and Internal Roadways

AS/NZS1158.3.1:2020	*Lighting for roads and public spaces*
	Part 3.1: Pedestrian area (Category P) lighting – Performance and design requirements

Sporting Facilities

AS2560.2:2021	*Sports lighting*
	Part 2: Specific applications

All External Lighting

AS/NZS4282:2019	*Control of the obtrusive effects of outdoor lighting*
	A3 Environmental Zone
	Curfew

9. Summary and Conclusion

9.1. Key Considerations

The baseline study demonstrates that the existing installation pre-dates the requirements of AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting.

The proposed lighting system, although much more extensive, will have a greatly reduced impact on the surrounding environment due to high levels of control through thoughtful design and application of the proposed lighting systems. Furthermore, the proposed lighting system greatly expands the useful areas of the park during night-time hours and presents a much more attractive and safe location for users to visit.

The needs of park users, sensitive receptors (both human and fauna) and energy efficiency have all been considered, and the proposed scheme presents a balanced outcome for all stakeholders.

Not all spaces within the park need to be lit. Large sections of unlit spaces, punctuated by the pathways help to reinforce the sense of re-wilding and supply visual interest for park users.

Visual comfort for park users is addressed through the use of appropriate luminaires and light-sources, which supply enhanced visual conditions realised as reduced glare and improved visual-comfort.

Selection of light-sources and placement of luminaires results in the minimisation of obtrusive light to neighbouring residences and fauna inhabiting the park. Cumulative sky-glow is also reduced.

Through the use of efficient luminaires and by applying control measures to the lights, the energy usage of the scheme is minimised.

10.Operation and Design Suitability

All lighting proposed for the development is designed to meet the technical operational requirements of BCC.

The lighting design is constructible, maintainable, sustainable, safe, and affordable. It has regard to the ability to access the installation for maintenance, cost of equipment used, and the availability and cost of spare and replacement parts.

Lamp sources, luminaire types and luminaire locations have been selected to supply favourable outcomes to all stakeholders.

Obtrusive light to sensitive receptors and visual comfort for park users were guiding principles considered at all stages of the design.

Energy use has been minimised through lighting control methodologies.

VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

SITE PLAN
SCALE: N.T.S.

LOCALITY PLAN
SCALE: N.T.S.

GENERAL LIGHTING NOTES:

1. THIS DRAWING SET IS A SUMMARY OF THE GENERAL REQUIREMENTS FOR THIS PROJECT AND IS CONCEPTUAL ONLY. IT IS EXPECTED THAT THIS DESIGN WILL BE SUBJECT TO DETAILED DESIGN AND VERIFICATION.

2. THE PROPOSED LIGHTING SCHEME MEETS OR EXCEEDS THE RELEVANT ILLUMINANCE VALUES AND UNIFORMITY RECOMMENDED IN THE FOLLOW STANDARDS:
   - 2.1. AS/NZS2560.2-2021 FOR A CLUB COMPETITION FOOTBALL FIELD, TENNIS, NETBALL AND OUTDOOR CRICKET PRACTICE WICKET.
   - 2.2. AS/NZS1158.3.1-2020 FOR PATHWAYS, CAR PARKS AND INTERNAL ROADWAYS.
   - 2.3. BCC CITY PLAN 2014 WITH DEPARTURES AS LISTED IN OUR LIGHTING REPORT.

3. UNLESS NOTED OTHERWISE, THE VALUES SHOWN ARE HORIZONTAL MAINTENANCE ILLUMINANCE ON AN OPEN UNOBSTRUCTED PLANE AT GRADE.

4. ALL LUMINAIRE DATA IS SUPPLIED BY MANUFACTURER.

5. DESIGN SOFTWARE USE AGI32 V19

6. ALL CALCULATIONS AND RESULTS PROVIDED ARE SUBJECT TO TOLERANCES IN ACCORDANCE WITH AS/NZS3827.1-1998 AND AS.NZS3827.2-1998 LIGHTING SYSTEM PERFORMANCE AND ACCURACY TOLERANCES.

7. FOR CLARITY, ONLY HORIZONTAL ILLUMINANCE PLANES ARE SHOWN.

8. THE NUMBER OF FITTINGS SHOWN, AND THE TYPE OF FITTINGS ARE THE MINIMUM REQUIRED AND ADDITIONAL FITTINGS MAY BE NECESSARY IN THE FINAL COORDINATION.

LIGHTING SYSTEM MAINTENANCE
THE COMBINED LIGHT-LOSS FACTOR APPLIED TO THESE CALCULATIONS IS BASED ON:

9. 6 YEAR CLEANING OF LUMINAIRES IN A URBAN POLLUTION SUB-CATEGORY ENVIRONMENT.

10. IP6X LUMINAIRE

11. 20 YEAR DESIGN LIFE.

12. SPOT REPLACEMENT OF FAILED LIGHT SOURCES.

OBTRUSIVE LIGHTING ANALYSIS
13. COMPLIANCE WITH AS/NZS4282-2019 IS DEMONSTRATED FOR A A3 ZONE FOR PRE AND POST-CURFEW OPERATION, NEW INSTALLATION.

14. ALL OBTRUSIVE LIGHT ANALYSIS IS EVALUATED AT INITIAL FLUX..

LIGHTING CERTIFICATION

LIGHTING CERTIFIED TO COMPLY WITH THE FOLLOWING STANDARDS:
AS/NZS2560.2–2021 FOR A CLUB COMPETITION FOOTBALL FIELD, TENNIS, NETBALL AND OUTDOOR CRICKET PRACTICE WICKET.
AS/NZS1158.3.1–2020 FOR PATHWAYS, CAR PARKS AND INTERNAL ROADWAYS.
BCC CITY PLAN 2014 WITH DEPARTURES AS LISTED IN OUR LIGHTING REPORT.
AS/NZS4282 A3 ZONE POST CURFEW FOR OBTRUSIVE LIGHT PROPOSED DESIGN.

* INSTALLATION MUST COMPLY WITH AS/NZS3000.
* ALL LUMINAIRE DATA HAS BEEN SUPPLIED BY MANUFACTURER.

VICTORIA PARK

FIES RLP No. 2007

Rb LUMINAIRE SCHEDULE

Symbol	Qty	Label	Luminaire Lumens	LLF	Description
	25	PC1	8995	1.000	AEC I-TRON ZERO 76W 3000K S05 OPTIC LED CAR PARK LIGHT FLAT GLASS POLE MOUNTED 5.5m ABOVE GRADE C/W INTEGRAL CONTROL GEAR AND NEMA BASE SWITCHED BY PE CELL
	12	PC1A	8995	1.000	TWIN BACK TO BACK TYPE PC1
	13	PC3	8995	1.000	AEC I-TRON ZERO 76W 3000K S05 OPTIC LED CAR PARK LIGHT FLAT GLASS POLE MOUNTED 5.5m ABOVE GRADE C/W INTEGRAL CONTROL GEAR NEMA BASE SWITCHED BY PE CELL
	1	PC3A	8995	1.000	TWIN BACK TO BACK TYPE PC3
	238	PP3	4590	1.000	AEC I-TRON ZERO 39W 3000K STU-S OPTIC LED PATHWAY LIGHT FLAT GLASS POLE MOUNTED 5.5m ABOVE GRADE C/W INTEGRAL CONTROL GEAR NMEA BASE SWITCHED BY PE CELL
	235	PP4	2060	1.000	AEC I-TRON ZERO 19W 3000K STA OPTIC LED PATHWAY LIGHT FLAT GLASS POLE MOUNTED 5.5m ABOVE GRADE C/W INTEGRAL CONTROL GEAR NEAM BASE SWITCHED BY PE CELL
	29	PR5	8995	1.000	AEC I-TRON ZERO 76W 3000K S05 OPTIC LED ROADWAY LIGHT FLAT GLASS POLE MOUNTED 5.5m ABOVE GRADE C/W INTEGRAL CONTROL GEAR NEAM BASE SWITCHED BY PE CELL
	38	PR5A	8995	1.000	TWIN BACK TO BACK TYPE PR5
	21	S1	201203	1.000	EWO R SYSTEM R4 GEN 3 MAX 2000W 4000K EP09 OPTIC LED SPORTS LIGHT FLAT GLASS POLE MOUNTED 18m ABOVE GRADE C/W REMOTE CONTROL GEAR SWITCHED BY PE CELL ACTIVATION AND TIME CLOCK DEACTIVIATION AT CURFEW
	30	S2	201203	1.000	EWO R SYSTEM R4 GEN 3 MAX 1000W 4000K EP09 OPTIC LED SPORTS LIGHT FLAT GLASS POLE MOUNTED 8m ABOVE GRADE C/W INTEGRAL CONTROL GEAR SWITCHED BY PE CELL ACTIVATION AND TIME CLOCK DEACTIVIATION AT CURFEW
	11	S2A	201203	1.000	TWIN BACK TO BACK TYPE F2

Drawing List

Drawing Number	Sheet Number	Revision	Title
URB00352-E01	1	D	Title Page
URB00352-E02	2	D	Luminaire Hierarchy
URB00352-E03	3	D	Luminaire Locations 1
URB00352-E04	4	D	Luminaire Locations 2
URB00352-E05	5	D	Luminaire Locations 3
URB00352-E06	6	D	Luminaire Locations 4
URB00352-E07	7	C	Obtrusive Light Existing Conditons
URB00352-E08	8	D	Proposed Indicative Render
URB00352-E09	9	C	Obtrusive Light Proposed Non-Curfew Conditons
URB00352-E10	10	D	Obtrusive Light Proposed Curfew Conditons
URB00352-E11	11	0	Back Cover

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ISSUED FOR CONCEPT PURPOSES ONLY

Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	UPDATED DRAWING NOTES AND DRAWING LIST	SAF
B	21-11-22	TD	LUMINAIRE AND DRAWING LIST	SAF
C	20-3-23	TD	DRAWING LIST	SAF
D	7-6-23	TD	DRAWING NOTES AND LIST UPDATED, LUMINAIRE SCHEDULE CT AND MODEL CHANGED.	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
TITLE PAGE

Drawn: TD Chk SAF Date: 07/06/2023
Scale: N.T.S.
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street Loganholme QLD 4129
E admin@rubidiumlight.com.au

PC1 - MAJOR CAR PARK

PC3 - MINOR CAR PARK

SPORTS

PR5 AND PP3 - ROADWAYS AND BIKE PATHS

PP4 - PATHWAYS

BUILDINGS

DESIGN NOTES:

1. ANY LIGHTING IN REWILDED AREA TO BE TIME LIMITED TO MITIGATE POTENTIAL FAUNA IMPACTS.

LIGHTING HIERARCHY

SCALE: N.T.S.

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Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	ZONES UPDATED	SAF
B	21-11-22	TD	ZONES UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND ZONES UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
LIGHTING SUB-CATAGORIES

Drawn: TD Chk SAF Date: 13/06/2023
Scale: 1:5000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
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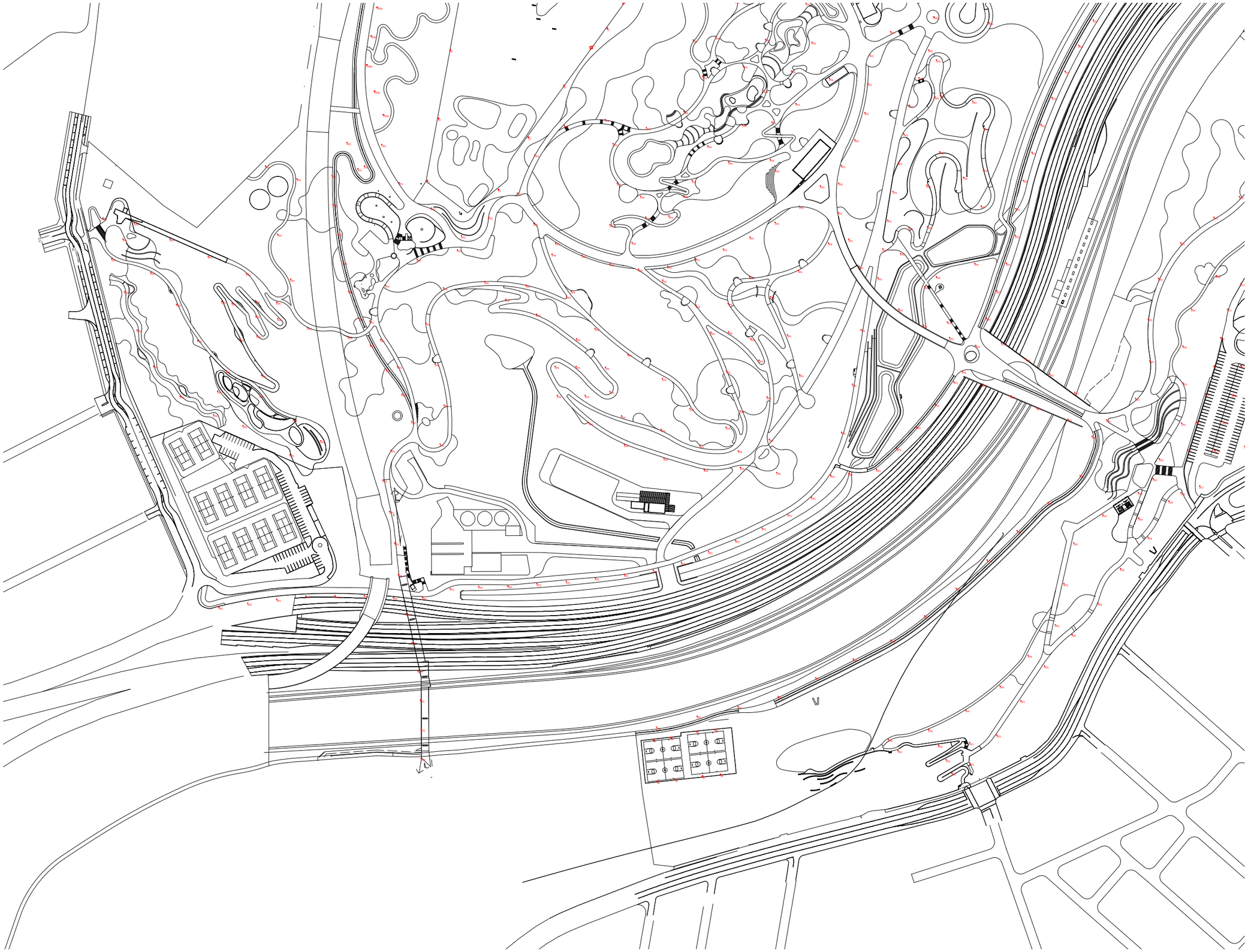

KEY PLAN

SCALE: N.T.S.

DESIGN NOTES:

1. ANY LIGHTING IN REWILDED AREA TO BE TIME LIMITED TO MITIGATE POTENTIAL FAUNA IMPACTS.

LUMINAIRE LOCATIONS SHEET 1

SCALE: 1:3000

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Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
PROPOSED LUMINAIRE LOCATIONS 1

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:3000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
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Rb rubidium light

KEY PLAN

SCALE: N.T.S.

DESIGN NOTES:

1. ANY LIGHTING IN REWILDED AREA TO BE TIME LIMITED TO MITIGATE POTENTIAL FAUNA IMPACTS.

LUMINAIRE LOCATIONS SHEET 2

SCALE: 1:3000

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Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
PROPOSED LUMINAIRE LOCATIONS 2

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:3000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
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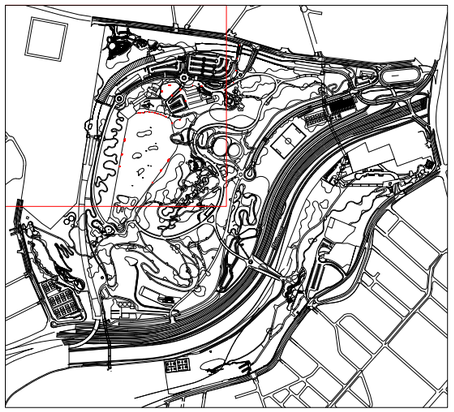
Rb rubidium light



KEY PLAN

SCALE: N.T.S.

DESIGN NOTES:

1. ANY LIGHTING IN REWILDED AREA TO BE TIME LIMITED TO MITIGATE POTENTIAL FAUNA IMPACTS.

LUMINAIRE LOCATIONS SHEET 3

SCALE: 1:3000

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Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
PROPOSED LUMINAIRE LOCATIONS 3

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:3000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
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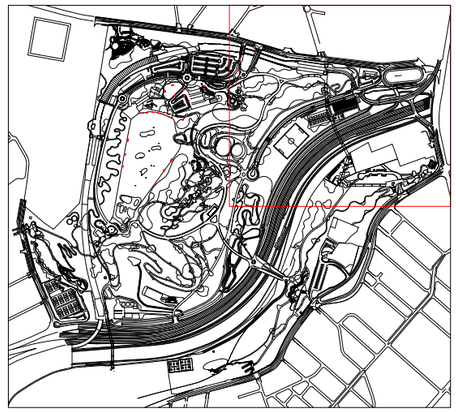

KEY PLAN

SCALE: N.T.S.

DESIGN NOTES:

1. ANY LIGHTING IN REWILDED AREA TO BE TIME LIMITED TO MITIGATE POTENTIAL FAUNA IMPACTS.

LUMINAIRE LOCATIONS SHEET 4

SCALE: 1:3000

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Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
PROPOSED LUMINAIRE LOCATIONS 4

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:3000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
Loganholme QLD 4129
E admin@rubidiumlight.com.au

Rb rubidium light

Obtrusive Light - Compliance Report
AS/NZS 4282:2019, A3 - Medium District Brightness, Curfew
Filename: URB00352 DILAPIDATION SURVEY
2/09/2022 11:08:18 AM

Illuminance
Maximum Allowable Value: 2 Lux

Calculations Tested (45):

Calculation Label	Test Results	Max. Illum.
REL BDY_Ill_Seg1	FAIL	4
REL BDY_Ill_Seg2	PASS	0
REL BDY_Ill_Seg3	PASS	0
REL BDY_Ill_Seg4	PASS	1
REL BDY_Ill_Seg5	PASS	2
REL BDY_Ill_Seg6	FAIL	3
REL BDY_Ill_Seg7	FAIL	3
REL BDY_Ill_Seg8	FAIL	3
REL BDY_Ill_Seg9	FAIL	4
REL BDY_Ill_Seg10	FAIL	4
REL BDY_Ill_Seg11	FAIL	5
REL BDY_Ill_Seg12	FAIL	5
REL BDY_Ill_Seg13	FAIL	5
REL BDY_Ill_Seg14	FAIL	5
REL BDY_Ill_Seg15	FAIL	5
REL BDY_Ill_Seg16	FAIL	5
REL BDY_Ill_Seg17	FAIL	5
REL BDY_Ill_Seg18	FAIL	5
REL BDY_Ill_Seg19	FAIL	4
REL BDY_Ill_Seg20	FAIL	4
REL BDY_Ill_Seg21	FAIL	3
REL BDY_Ill_Seg22	PASS	2
REL BDY_Ill_Seg23	PASS	2
REL BDY_Ill_Seg24	PASS	2
REL BDY_Ill_Seg25	PASS	2
REL BDY_Ill_Seg26	PASS	1
REL BDY_Ill_Seg27	PASS	1
REL BDY_Ill_Seg28	PASS	0
REL BDY_Ill_Seg29	PASS	0
REL BDY_Ill_Seg30	PASS	0
REL BDY_Ill_Seg31	PASS	0
REL BDY_Ill_Seg32	PASS	0
REL BDY_Ill_Seg33	PASS	0
REL BDY_Ill_Seg34	PASS	0
REL BDY_Ill_Seg35	PASS	0
REL BDY_Ill_Seg36	PASS	0
REL BDY_Ill_Seg37	PASS	0
REL BDY_Ill_Seg38	PASS	0
REL BDY_Ill_Seg39	PASS	0
REL BDY_Ill_Seg40	PASS	1
REL BDY_Ill_Seg41	FAIL	18
REL BDY_Ill_Seg42	PASS	1
REL BDY_Ill_Seg43	PASS	1
REL BDY_Ill_Seg44	PASS	0
REL BDY_Ill_Seg45	PASS	0

Luminous Intensity (Cd) At Vertical Planes
Maximum Allowable Value: 2500 Cd

Calculations Tested (45):

Calculation Label	Test Results
REL BDY_Cd_Seg1	FAIL
REL BDY_Cd_Seg2	FAIL
REL BDY_Cd_Seg3	PASS
REL BDY_Cd_Seg4	FAIL
REL BDY_Cd_Seg5	FAIL
REL BDY_Cd_Seg6	FAIL
REL BDY_Cd_Seg7	FAIL
REL BDY_Cd_Seg8	FAIL
REL BDY_Cd_Seg9	FAIL
REL BDY_Cd_Seg10	FAIL
REL BDY_Cd_Seg11	FAIL
REL BDY_Cd_Seg12	FAIL
REL BDY_Cd_Seg13	FAIL
REL BDY_Cd_Seg14	FAIL
REL BDY_Cd_Seg15	FAIL
REL BDY_Cd_Seg16	FAIL
REL BDY_Cd_Seg17	FAIL
REL BDY_Cd_Seg18	FAIL
REL BDY_Cd_Seg19	FAIL
REL BDY_Cd_Seg20	FAIL
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REL BDY_Cd_Seg37	FAIL
REL BDY_Cd_Seg38	FAIL
REL BDY_Cd_Seg39	FAIL
REL BDY_Cd_Seg40	FAIL
REL BDY_Cd_Seg41	FAIL
REL BDY_Cd_Seg42	FAIL
REL BDY_Cd_Seg43	FAIL
REL BDY_Cd_Seg44	FAIL
REL BDY_Cd_Seg45	FAIL

Upward Waste Light Ratio (UWLR)
Maximum Allowable Value: 2.0 %

Calculated UWLR: 19.0 %
Test Results: FAIL

NOT FOR CONSTRUCTION
ISSUED FOR CONCEPT PURPOSES ONLY

EXISTING CONDITIONS

SCALE: 1:5000

Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	ISSUED FOR INCLUSION IN REPORT	SAF

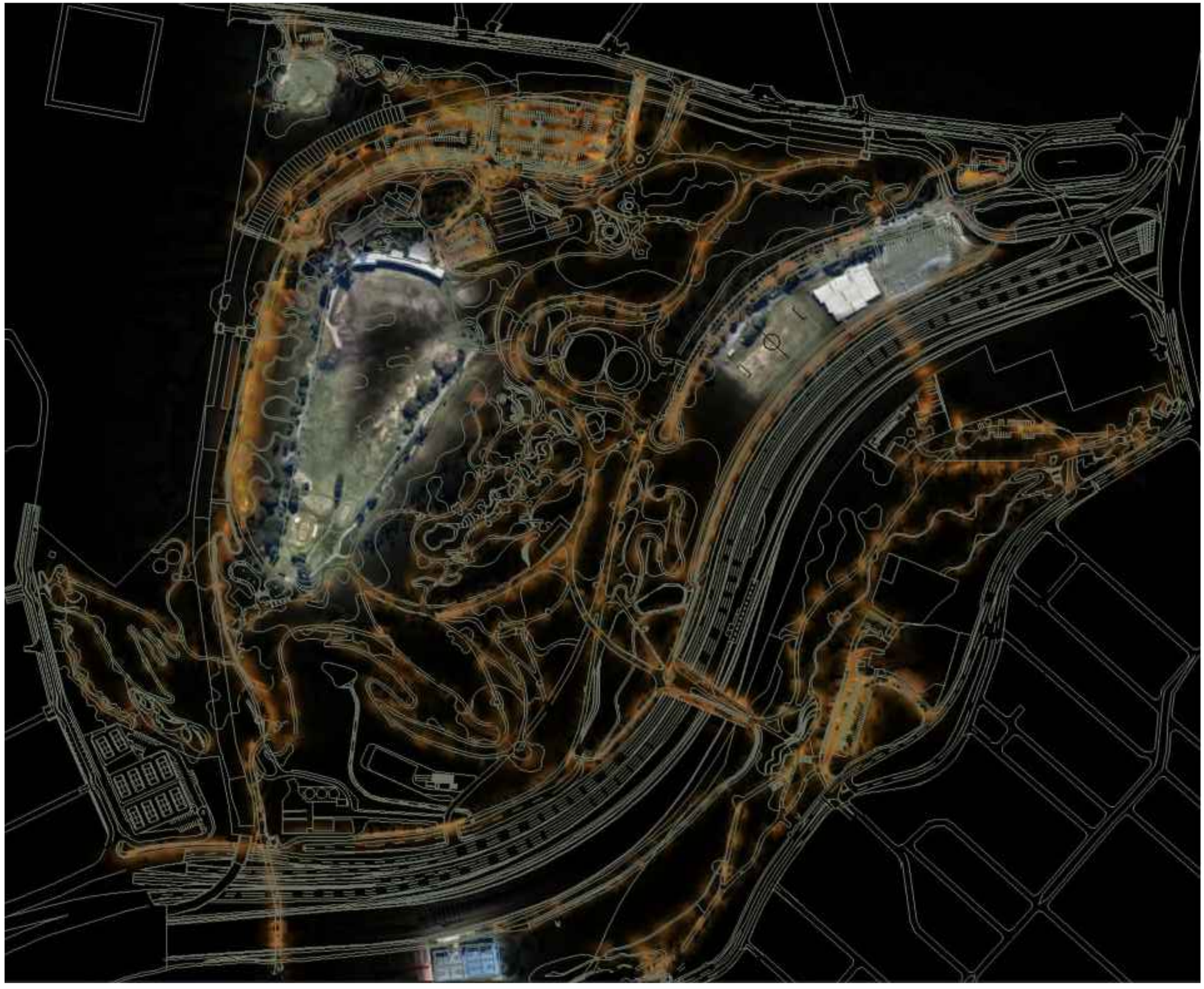
Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
OBTRUSIVE LIGHT EXISITING CONDITIONS

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:5000
Drawing No. URB00352-E01D.DWG Rev C Size A3

Rubidium Light
A 13 Omaru Street
Loganholme QLD 4129
E admin@rubidiumlight.com.au

Rb rubidium light



DESIGN NOTES:

1. THIS RENDER ILLUSTRATES WORST CASE LIGHTING SCENARIO. PLEASE REFER TO POST CURFEW RENDER FOR POST TIME LIMITED LIGHTING ACTIVATION.

INDICATIVE RENDER PROPOSED NON-CURFEW

SCALE: 1:5000

NOT FOR CONSTRUCTION
ISSUED FOR CONCEPT PURPOSES ONLY

Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	DESIGN NOTE ADDED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
INDICATIVE REDNER PROPOSED NON-CURFEW

Drawn: TD Chk SAF Date: 07/06/2023
Scale: N.T.S.
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
Loganholme QLD 4129
E admin@rubidiumlight.com.au

Rb rubidium light

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A3 - Medium District Brightness, Non-Curfew L2
Filename: URB00352 PROPOSED DESIGN
2/09/2022 11:42:06 AM

Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (86):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_1_Ill_Seg1	PASS	2
ObtrusiveLight_1_Ill_Seg2	PASS	1
ObtrusiveLight_1_Ill_Seg3	PASS	0
ObtrusiveLight_1_Ill_Seg4	PASS	0
ObtrusiveLight_1_Ill_Seg5	PASS	0
ObtrusiveLight_1_Ill_Seg6	PASS	0
ObtrusiveLight_1_Ill_Seg7	PASS	0
ObtrusiveLight_1_Ill_Seg8	PASS	0
ObtrusiveLight_1_Ill_Seg9	PASS	0
ObtrusiveLight_1_Ill_Seg10	PASS	0
ObtrusiveLight_1_Ill_Seg11	PASS	0
ObtrusiveLight_1_Ill_Seg12	PASS	0
ObtrusiveLight_1_Ill_Seg13	PASS	0
ObtrusiveLight_1_Ill_Seg14	PASS	0
ObtrusiveLight_1_Ill_Seg15	PASS	0
ObtrusiveLight_1_Ill_Seg16	PASS	0
ObtrusiveLight_1_Ill_Seg17	PASS	0
ObtrusiveLight_1_Ill_Seg18	PASS	0
ObtrusiveLight_1_Ill_Seg19	PASS	0
ObtrusiveLight_1_Ill_Seg20	PASS	0
ObtrusiveLight_1_Ill_Seg21	PASS	0
ObtrusiveLight_1_Ill_Seg22	PASS	0
ObtrusiveLight_1_Ill_Seg23	PASS	0
ObtrusiveLight_1_Ill_Seg24	PASS	0
ObtrusiveLight_1_Ill_Seg25	PASS	1
ObtrusiveLight_1_Ill_Seg26	PASS	0
ObtrusiveLight_1_Ill_Seg27	PASS	0
ObtrusiveLight_1_Ill_Seg28	PASS	0
ObtrusiveLight_1_Ill_Seg29	PASS	0
ObtrusiveLight_1_Ill_Seg30	PASS	0
ObtrusiveLight_1_Ill_Seg31	PASS	0
ObtrusiveLight_1_Ill_Seg32	PASS	0
ObtrusiveLight_1_Ill_Seg33	PASS	0
ObtrusiveLight_1_Ill_Seg34	PASS	4
ObtrusiveLight_1_Ill_Seg35	PASS	1
ObtrusiveLight_1_Ill_Seg36	PASS	0
ObtrusiveLight_1_Ill_Seg37	PASS	0
ObtrusiveLight_1_Ill_Seg38	PASS	0
ObtrusiveLight_1_Ill_Seg39	PASS	0
ObtrusiveLight_1_Ill_Seg40	PASS	1
ObtrusiveLight_1_Ill_Seg41	PASS	1
ObtrusiveLight_1_Ill_Seg42	PASS	0
ObtrusiveLight_1_Ill_Seg43	PASS	0
ObtrusiveLight_1_Ill_Seg44	PASS	0
ObtrusiveLight_1_Ill_Seg45	PASS	0
ObtrusiveLight_1_Ill_Seg46	PASS	0
ObtrusiveLight_1_Ill_Seg47	PASS	0
ObtrusiveLight_1_Ill_Seg48	PASS	0
ObtrusiveLight_1_Ill_Seg49	PASS	1
ObtrusiveLight_1_Ill_Seg50	PASS	0
ObtrusiveLight_1_Ill_Seg51	PASS	0
ObtrusiveLight_1_Ill_Seg52	PASS	0
ObtrusiveLight_1_Ill_Seg53	PASS	0
ObtrusiveLight_1_Ill_Seg54	PASS	0
ObtrusiveLight_1_Ill_Seg55	PASS	0
ObtrusiveLight_1_Ill_Seg56	PASS	0
ObtrusiveLight_1_Ill_Seg57	PASS	0
ObtrusiveLight_1_Ill_Seg58	PASS	0
ObtrusiveLight_1_Ill_Seg59	PASS	0
ObtrusiveLight_1_Ill_Seg60	PASS	0
ObtrusiveLight_1_Ill_Seg61	PASS	0
ObtrusiveLight_1_Ill_Seg62	PASS	0
ObtrusiveLight_1_Ill_Seg63	PASS	0
ObtrusiveLight_1_Ill_Seg64	PASS	0
ObtrusiveLight_1_Ill_Seg65	PASS	0
ObtrusiveLight_1_Ill_Seg66	PASS	6
ObtrusiveLight_1_Ill_Seg67	PASS	5
ObtrusiveLight_1_Ill_Seg68	PASS	1
ObtrusiveLight_1_Ill_Seg69	PASS	0
ObtrusiveLight_1_Ill_Seg70	PASS	3
ObtrusiveLight_1_Ill_Seg71	PASS	3
ObtrusiveLight_1_Ill_Seg72	PASS	0
ObtrusiveLight_1_Ill_Seg73	PASS	1
ObtrusiveLight_1_Ill_Seg74	PASS	1
ObtrusiveLight_1_Ill_Seg75	PASS	0
ObtrusiveLight_1_Ill_Seg76	PASS	0
ObtrusiveLight_1_Ill_Seg77	PASS	0
ObtrusiveLight_1_Ill_Seg78	PASS	0
ObtrusiveLight_1_Ill_Seg79	PASS	0
ObtrusiveLight_1_Ill_Seg80	PASS	0
ObtrusiveLight_1_Ill_Seg81	PASS	0
ObtrusiveLight_1_Ill_Seg82	PASS	2
ObtrusiveLight_1_Ill_Seg83	PASS	1
ObtrusiveLight_1_Ill_Seg84	PASS	1
ObtrusiveLight_1_Ill_Seg85	PASS	0
ObtrusiveLight_1_Ill_Seg86	PASS	1

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 25000 Cd

Calculations Tested (86):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS
ObtrusiveLight_1_Cd_Seg3	PASS
ObtrusiveLight_1_Cd_Seg4	PASS
ObtrusiveLight_1_Cd_Seg5	PASS
ObtrusiveLight_1_Cd_Seg6	PASS
ObtrusiveLight_1_Cd_Seg7	PASS
ObtrusiveLight_1_Cd_Seg8	PASS
ObtrusiveLight_1_Cd_Seg9	PASS
ObtrusiveLight_1_Cd_Seg10	PASS
ObtrusiveLight_1_Cd_Seg11	PASS
ObtrusiveLight_1_Cd_Seg12	PASS
ObtrusiveLight_1_Cd_Seg13	PASS
ObtrusiveLight_1_Cd_Seg14	PASS
ObtrusiveLight_1_Cd_Seg15	PASS
ObtrusiveLight_1_Cd_Seg16	PASS
ObtrusiveLight_1_Cd_Seg17	PASS
ObtrusiveLight_1_Cd_Seg18	PASS
ObtrusiveLight_1_Cd_Seg19	PASS
ObtrusiveLight_1_Cd_Seg20	PASS
ObtrusiveLight_1_Cd_Seg21	PASS
ObtrusiveLight_1_Cd_Seg22	PASS
ObtrusiveLight_1_Cd_Seg23	PASS
ObtrusiveLight_1_Cd_Seg24	PASS
ObtrusiveLight_1_Cd_Seg25	PASS
ObtrusiveLight_1_Cd_Seg26	PASS
ObtrusiveLight_1_Cd_Seg27	PASS
ObtrusiveLight_1_Cd_Seg28	PASS
ObtrusiveLight_1_Cd_Seg29	PASS
ObtrusiveLight_1_Cd_Seg30	PASS
ObtrusiveLight_1_Cd_Seg31	PASS
ObtrusiveLight_1_Cd_Seg32	PASS
ObtrusiveLight_1_Cd_Seg33	PASS
ObtrusiveLight_1_Cd_Seg34	PASS
ObtrusiveLight_1_Cd_Seg35	PASS
ObtrusiveLight_1_Cd_Seg36	PASS
ObtrusiveLight_1_Cd_Seg37	PASS
ObtrusiveLight_1_Cd_Seg38	PASS
ObtrusiveLight_1_Cd_Seg39	PASS
ObtrusiveLight_1_Cd_Seg40	PASS
ObtrusiveLight_1_Cd_Seg41	PASS
ObtrusiveLight_1_Cd_Seg42	PASS
ObtrusiveLight_1_Cd_Seg43	PASS
ObtrusiveLight_1_Cd_Seg44	PASS
ObtrusiveLight_1_Cd_Seg45	PASS
ObtrusiveLight_1_Cd_Seg46	PASS
ObtrusiveLight_1_Cd_Seg47	PASS
ObtrusiveLight_1_Cd_Seg48	PASS
ObtrusiveLight_1_Cd_Seg49	PASS
ObtrusiveLight_1_Cd_Seg50	PASS
ObtrusiveLight_1_Cd_Seg51	PASS
ObtrusiveLight_1_Cd_Seg52	PASS
ObtrusiveLight_1_Cd_Seg53	PASS
ObtrusiveLight_1_Cd_Seg54	PASS
ObtrusiveLight_1_Cd_Seg55	PASS
ObtrusiveLight_1_Cd_Seg56	PASS
ObtrusiveLight_1_Cd_Seg57	PASS
ObtrusiveLight_1_Cd_Seg58	PASS
ObtrusiveLight_1_Cd_Seg59	PASS
ObtrusiveLight_1_Cd_Seg60	PASS
ObtrusiveLight_1_Cd_Seg61	PASS
ObtrusiveLight_1_Cd_Seg62	PASS
ObtrusiveLight_1_Cd_Seg63	PASS
ObtrusiveLight_1_Cd_Seg64	PASS
ObtrusiveLight_1_Cd_Seg65	PASS
ObtrusiveLight_1_Cd_Seg66	PASS
ObtrusiveLight_1_Cd_Seg67	PASS
ObtrusiveLight_1_Cd_Seg68	PASS
ObtrusiveLight_1_Cd_Seg69	PASS
ObtrusiveLight_1_Cd_Seg70	PASS
ObtrusiveLight_1_Cd_Seg71	PASS
ObtrusiveLight_1_Cd_Seg72	PASS
ObtrusiveLight_1_Cd_Seg73	PASS
ObtrusiveLight_1_Cd_Seg74	PASS
ObtrusiveLight_1_Cd_Seg75	PASS
ObtrusiveLight_1_Cd_Seg76	PASS
ObtrusiveLight_1_Cd_Seg77	PASS
ObtrusiveLight_1_Cd_Seg78	PASS
ObtrusiveLight_1_Cd_Seg79	PASS
ObtrusiveLight_1_Cd_Seg80	PASS
ObtrusiveLight_1_Cd_Seg81	PASS
ObtrusiveLight_1_Cd_Seg82	PASS
ObtrusiveLight_1_Cd_Seg83	PASS
ObtrusiveLight_1_Cd_Seg84	PASS
ObtrusiveLight_1_Cd_Seg85	PASS
ObtrusiveLight_1_Cd_Seg86	PASS

Upward Waste Light Ratio (UWLR)

Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %
Test Results: PASS

NOT FOR CONSTRUCTION
ISSUED FOR CONCPET PURPOSES ONLY

PROPOSED DESIGN NON-CURFEW

SCALE: 1:5000

Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
OBTRUSIVE LIGHT PROPOSED NON-CURFEW

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:5000
Drawing No. URB00352-E01D.DWG Rev C Size A3

Rubidium Light
A 13 Omaru Street
Loganholme QLD 4129
E admin@rubidiumlight.com.au

Rb rubidium light

Obtrusive Light - Compliance Report

AS/NZS 4282:2019, A3 - Medium District Brightness, Non-Curfew L2
Filename: URB00352 PROPOSED DESIGN
2/09/2022 11:42:06 AM

Illuminance

Maximum Allowable Value: 10 Lux

Calculations Tested (86):

Calculation Label	Test Results	Max. Illum.
ObtrusiveLight_1_Ill_Seg1	PASS	2
ObtrusiveLight_1_Ill_Seg2	PASS	1
ObtrusiveLight_1_Ill_Seg3	PASS	0
ObtrusiveLight_1_Ill_Seg4	PASS	0
ObtrusiveLight_1_Ill_Seg5	PASS	0
ObtrusiveLight_1_Ill_Seg6	PASS	0
ObtrusiveLight_1_Ill_Seg7	PASS	0
ObtrusiveLight_1_Ill_Seg8	PASS	0
ObtrusiveLight_1_Ill_Seg9	PASS	0
ObtrusiveLight_1_Ill_Seg10	PASS	0
ObtrusiveLight_1_Ill_Seg11	PASS	0
ObtrusiveLight_1_Ill_Seg12	PASS	0
ObtrusiveLight_1_Ill_Seg13	PASS	0
ObtrusiveLight_1_Ill_Seg14	PASS	0
ObtrusiveLight_1_Ill_Seg15	PASS	0
ObtrusiveLight_1_Ill_Seg16	PASS	0
ObtrusiveLight_1_Ill_Seg17	PASS	0
ObtrusiveLight_1_Ill_Seg18	PASS	0
ObtrusiveLight_1_Ill_Seg19	PASS	0
ObtrusiveLight_1_Ill_Seg20	PASS	0
ObtrusiveLight_1_Ill_Seg21	PASS	0
ObtrusiveLight_1_Ill_Seg22	PASS	0
ObtrusiveLight_1_Ill_Seg23	PASS	0
ObtrusiveLight_1_Ill_Seg24	PASS	0
ObtrusiveLight_1_Ill_Seg25	PASS	1
ObtrusiveLight_1_Ill_Seg26	PASS	0
ObtrusiveLight_1_Ill_Seg27	PASS	0
ObtrusiveLight_1_Ill_Seg28	PASS	0
ObtrusiveLight_1_Ill_Seg29	PASS	0
ObtrusiveLight_1_Ill_Seg30	PASS	0
ObtrusiveLight_1_Ill_Seg31	PASS	0
ObtrusiveLight_1_Ill_Seg32	PASS	0
ObtrusiveLight_1_Ill_Seg33	PASS	0
ObtrusiveLight_1_Ill_Seg34	PASS	4
ObtrusiveLight_1_Ill_Seg35	PASS	1
ObtrusiveLight_1_Ill_Seg36	PASS	0
ObtrusiveLight_1_Ill_Seg37	PASS	0
ObtrusiveLight_1_Ill_Seg38	PASS	0
ObtrusiveLight_1_Ill_Seg39	PASS	0
ObtrusiveLight_1_Ill_Seg40	PASS	1
ObtrusiveLight_1_Ill_Seg41	PASS	1
ObtrusiveLight_1_Ill_Seg42	PASS	0
ObtrusiveLight_1_Ill_Seg43	PASS	0
ObtrusiveLight_1_Ill_Seg44	PASS	0
ObtrusiveLight_1_Ill_Seg45	PASS	0
ObtrusiveLight_1_Ill_Seg46	PASS	0
ObtrusiveLight_1_Ill_Seg47	PASS	0
ObtrusiveLight_1_Ill_Seg48	PASS	0
ObtrusiveLight_1_Ill_Seg49	PASS	1
ObtrusiveLight_1_Ill_Seg50	PASS	0
ObtrusiveLight_1_Ill_Seg51	PASS	0
ObtrusiveLight_1_Ill_Seg52	PASS	0
ObtrusiveLight_1_Ill_Seg53	PASS	0
ObtrusiveLight_1_Ill_Seg54	PASS	0
ObtrusiveLight_1_Ill_Seg55	PASS	0
ObtrusiveLight_1_Ill_Seg56	PASS	0
ObtrusiveLight_1_Ill_Seg57	PASS	0
ObtrusiveLight_1_Ill_Seg58	PASS	0
ObtrusiveLight_1_Ill_Seg59	PASS	0
ObtrusiveLight_1_Ill_Seg60	PASS	0
ObtrusiveLight_1_Ill_Seg61	PASS	0
ObtrusiveLight_1_Ill_Seg62	PASS	0
ObtrusiveLight_1_Ill_Seg63	PASS	0
ObtrusiveLight_1_Ill_Seg64	PASS	0
ObtrusiveLight_1_Ill_Seg65	PASS	0
ObtrusiveLight_1_Ill_Seg66	PASS	6
ObtrusiveLight_1_Ill_Seg67	PASS	5
ObtrusiveLight_1_Ill_Seg68	PASS	1
ObtrusiveLight_1_Ill_Seg69	PASS	0
ObtrusiveLight_1_Ill_Seg70	PASS	3
ObtrusiveLight_1_Ill_Seg71	PASS	3
ObtrusiveLight_1_Ill_Seg72	PASS	0
ObtrusiveLight_1_Ill_Seg73	PASS	1
ObtrusiveLight_1_Ill_Seg74	PASS	1
ObtrusiveLight_1_Ill_Seg75	PASS	0
ObtrusiveLight_1_Ill_Seg76	PASS	0
ObtrusiveLight_1_Ill_Seg77	PASS	0
ObtrusiveLight_1_Ill_Seg78	PASS	0
ObtrusiveLight_1_Ill_Seg79	PASS	0
ObtrusiveLight_1_Ill_Seg80	PASS	0
ObtrusiveLight_1_Ill_Seg81	PASS	0
ObtrusiveLight_1_Ill_Seg82	PASS	2
ObtrusiveLight_1_Ill_Seg83	PASS	1
ObtrusiveLight_1_Ill_Seg84	PASS	1
ObtrusiveLight_1_Ill_Seg85	PASS	0
ObtrusiveLight_1_Ill_Seg86	PASS	1

Luminous Intensity (Cd) At Vertical Planes

Maximum Allowable Value: 25000 Cd

Calculations Tested (86):

Calculation Label	Test Results
ObtrusiveLight_1_Cd_Seg1	PASS
ObtrusiveLight_1_Cd_Seg2	PASS
ObtrusiveLight_1_Cd_Seg3	PASS
ObtrusiveLight_1_Cd_Seg4	PASS
ObtrusiveLight_1_Cd_Seg5	PASS
ObtrusiveLight_1_Cd_Seg6	PASS
ObtrusiveLight_1_Cd_Seg7	PASS
ObtrusiveLight_1_Cd_Seg8	PASS
ObtrusiveLight_1_Cd_Seg9	PASS
ObtrusiveLight_1_Cd_Seg10	PASS
ObtrusiveLight_1_Cd_Seg11	PASS
ObtrusiveLight_1_Cd_Seg12	PASS
ObtrusiveLight_1_Cd_Seg13	PASS
ObtrusiveLight_1_Cd_Seg14	PASS
ObtrusiveLight_1_Cd_Seg15	PASS
ObtrusiveLight_1_Cd_Seg16	PASS
ObtrusiveLight_1_Cd_Seg17	PASS
ObtrusiveLight_1_Cd_Seg18	PASS
ObtrusiveLight_1_Cd_Seg19	PASS
ObtrusiveLight_1_Cd_Seg20	PASS
ObtrusiveLight_1_Cd_Seg21	PASS
ObtrusiveLight_1_Cd_Seg22	PASS
ObtrusiveLight_1_Cd_Seg23	PASS
ObtrusiveLight_1_Cd_Seg24	PASS
ObtrusiveLight_1_Cd_Seg25	PASS
ObtrusiveLight_1_Cd_Seg26	PASS
ObtrusiveLight_1_Cd_Seg27	PASS
ObtrusiveLight_1_Cd_Seg28	PASS
ObtrusiveLight_1_Cd_Seg29	PASS
ObtrusiveLight_1_Cd_Seg30	PASS
ObtrusiveLight_1_Cd_Seg31	PASS
ObtrusiveLight_1_Cd_Seg32	PASS
ObtrusiveLight_1_Cd_Seg33	PASS
ObtrusiveLight_1_Cd_Seg34	PASS
ObtrusiveLight_1_Cd_Seg35	PASS
ObtrusiveLight_1_Cd_Seg36	PASS
ObtrusiveLight_1_Cd_Seg37	PASS
ObtrusiveLight_1_Cd_Seg38	PASS
ObtrusiveLight_1_Cd_Seg39	PASS
ObtrusiveLight_1_Cd_Seg40	PASS
ObtrusiveLight_1_Cd_Seg41	PASS
ObtrusiveLight_1_Cd_Seg42	PASS
ObtrusiveLight_1_Cd_Seg43	PASS
ObtrusiveLight_1_Cd_Seg44	PASS
ObtrusiveLight_1_Cd_Seg45	PASS
ObtrusiveLight_1_Cd_Seg46	PASS
ObtrusiveLight_1_Cd_Seg47	PASS
ObtrusiveLight_1_Cd_Seg48	PASS
ObtrusiveLight_1_Cd_Seg49	PASS
ObtrusiveLight_1_Cd_Seg50	PASS
ObtrusiveLight_1_Cd_Seg51	PASS
ObtrusiveLight_1_Cd_Seg52	PASS
ObtrusiveLight_1_Cd_Seg53	PASS
ObtrusiveLight_1_Cd_Seg54	PASS
ObtrusiveLight_1_Cd_Seg55	PASS
ObtrusiveLight_1_Cd_Seg56	PASS
ObtrusiveLight_1_Cd_Seg57	PASS
ObtrusiveLight_1_Cd_Seg58	PASS
ObtrusiveLight_1_Cd_Seg59	PASS
ObtrusiveLight_1_Cd_Seg60	PASS
ObtrusiveLight_1_Cd_Seg61	PASS
ObtrusiveLight_1_Cd_Seg62	PASS
ObtrusiveLight_1_Cd_Seg63	PASS
ObtrusiveLight_1_Cd_Seg64	PASS
ObtrusiveLight_1_Cd_Seg65	PASS
ObtrusiveLight_1_Cd_Seg66	PASS
ObtrusiveLight_1_Cd_Seg67	PASS
ObtrusiveLight_1_Cd_Seg68	PASS
ObtrusiveLight_1_Cd_Seg69	PASS
ObtrusiveLight_1_Cd_Seg70	PASS
ObtrusiveLight_1_Cd_Seg71	PASS
ObtrusiveLight_1_Cd_Seg72	PASS
ObtrusiveLight_1_Cd_Seg73	PASS
ObtrusiveLight_1_Cd_Seg74	PASS
ObtrusiveLight_1_Cd_Seg75	PASS
ObtrusiveLight_1_Cd_Seg76	PASS
ObtrusiveLight_1_Cd_Seg77	PASS
ObtrusiveLight_1_Cd_Seg78	PASS
ObtrusiveLight_1_Cd_Seg79	PASS
ObtrusiveLight_1_Cd_Seg80	PASS
ObtrusiveLight_1_Cd_Seg81	PASS
ObtrusiveLight_1_Cd_Seg82	PASS
ObtrusiveLight_1_Cd_Seg83	PASS
ObtrusiveLight_1_Cd_Seg84	PASS
ObtrusiveLight_1_Cd_Seg85	PASS
ObtrusiveLight_1_Cd_Seg86	PASS

Upward Waste Light Ratio (UWLR)

Maximum Allowable Value: 2.0 %

Calculated UWLR: 0.0 %
Test Results: PASS

NOT FOR CONSTRUCTION
ISSUED FOR CONCEPT PURPOSES ONLY

PROPOSED DESIGN CURFEW

SCALE: 1:5000

Rev.	Date	Drn.	Description	Chkd.
A	3-11-22	TD	LAYOUT UPDATED	SAF
C	20-3-23	TD	PROPOSED SITE DRAWING AND LUMINAIRE LOCATIONS UPDATED	SAF
D	7-6-23	TD	UPDATED TO SWITCHING AS PER CPTED DESIGN	SAF

Project:
VICTORIA PARK
OBTRUSIVE LIGHT STUDY
HERSTON QLD

Title:
ELECTRICAL SERVICES
LIGHTING SYSTEMS
OBTRUSIVE LIGHT PROPOSED CURFEW

Drawn: TD Chk SAF Date: 07/06/2023
Scale: 1:5000
Drawing No. URB00352-E01D.DWG Rev D Size A3

Rubidium Light
A 13 Omaru Street
Loganholme QLD 4129
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Rb rubidium light


Rb
rubidium light